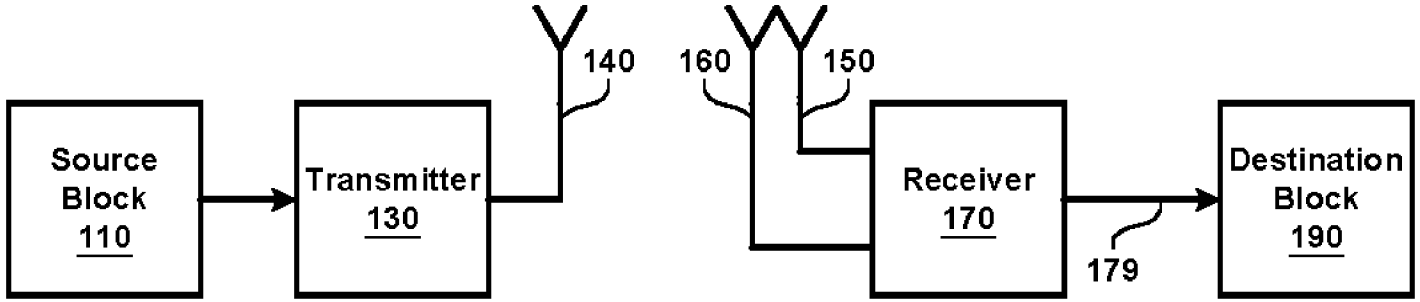
Source
Block
110
Transmitter
130
140
160
150
Receiver
170
179
Destination
Block
190

FIG. 1

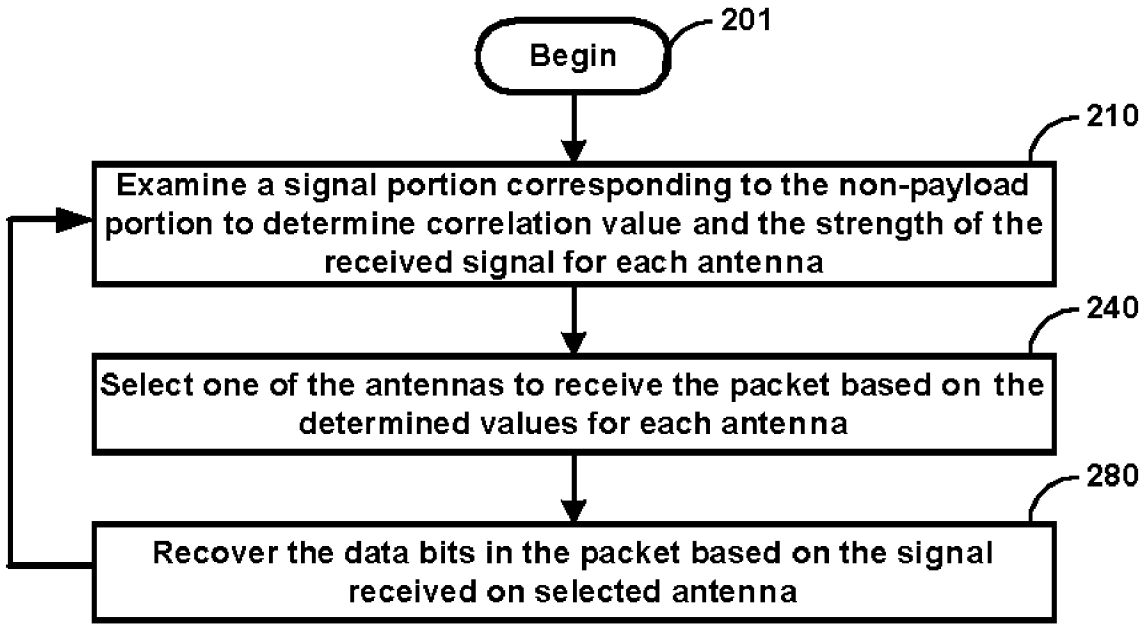
Begin
201
Examine a signal portion corresponding to the non-payload portion to determine correlation value and the strength of the received signal for each antenna
210
Select one of the antennas to receive the packet based on the determined values for each antenna
240
Recover the data bits in the packet based on the signal received on selected antenna
280

FIG. 2

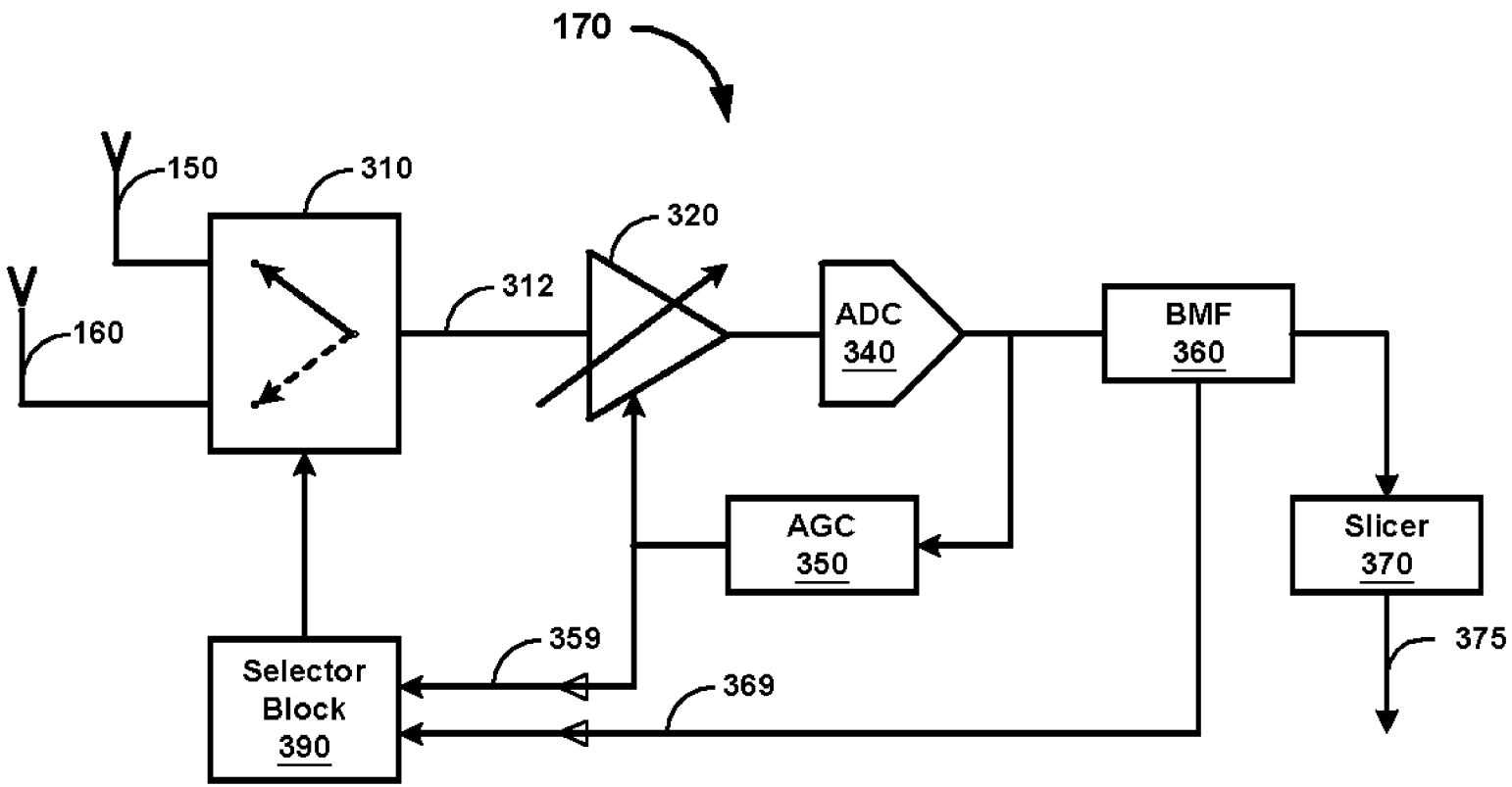
170
150
310
160
320
312
ADC
340
BMF
360
AGC
350
Slicer
370
375
359
Selector
Block
390
369

FIG. 3

FIG. 4A

$$1/K < \sigma_1^2/\sigma_2^2 < K \tag{1}$$

$$\mathbf{x}_k = s_k \mathbf{b} \tag{2}$$

$$\mathbf{y}_{1,k} = \sqrt{G_1}(\alpha_1\ \mathbf{x}_k + \mathbf{n}_{1,k}) \tag{3}$$

$$\mathbf{y}_{2,k} = \sqrt{G_2}(\alpha_2\ \mathbf{x}_k + \mathbf{n}_{2,k}) \tag{4}$$

$$G_i = \frac{P}{|\alpha_i|^2 + \sigma_i^2} \tag{5}$$

$$\doteq \frac{P}{\sigma_i^2(1+\rho_i)} \tag{6}$$

$$|\mathbf{b}^H \mathbf{y}_{i,k}|^2 = G_i \left[|\alpha_{i,k}|^2 |s_k|^2 N^2 + |\mathbf{b}^H \mathbf{n}_{i,k}|^2 + 2Re\left(\mathbf{b}^H \mathbf{n}_{i,k} N \alpha_{i,k}^* s_k^*\right)\right] \tag{7}$$

$$|\mathbf{b}^H\mathbf{y}_{i,k}|^2 = \frac{\rho_i}{1+\rho_i}N^2P + 2\Re\left(\frac{\mathbf{b}^H\mathbf{n}_{i,k}}{\sigma_i}\frac{\alpha_{i,k}^* s_k^*}{\sigma_i}\frac{NP}{1+\rho_i}\right) + |\frac{\mathbf{b}^H\mathbf{n}_{i,k}}{\sigma_i}|^2\frac{P}{1+\rho_i} \quad (8)$$

FIG. 4B

$$P([C_1, C_2, G_1, G_2]/\rho_1 > \rho_2) = \int_{\rho_2=0}^{\infty}\int_{\rho_1=\rho_2}^{\infty} f(C_1, C_2, G_1, G_2/\rho_1, \rho_2, \sigma_1^2, \sigma_2^2) f(\rho_1, \rho_2) f(\sigma_1^2, \sigma_2^2) d\rho_1 d\rho_2 d\sigma_1^2 d\sigma_2^2 \quad (9)$$

$$P([C_1, C_2, G_1, G_2]/\rho_1 > \rho_2) = \int_{\rho_2=0}^{\infty}\int_{\rho_1=\rho_2}^{\infty} f(C_1/\rho_1) f(C_2/\rho_2) f(G_1, G_2/\rho_1, \rho_2, \sigma_1^2, \sigma_2^2) f(\rho_1, \rho_2) f(\sigma_1^2, \sigma_2^2) d\rho_1 d\rho_2 d\sigma_1^2 d\sigma_2^2 \quad (10)$$

$$f(G_1, G_2/\rho_1, \rho_2, \sigma_1^2, \sigma_2^2) = \delta(G_1 - \frac{P}{\sigma_1^2(1+\rho_1)}, G_2 - \frac{P}{\sigma_2^2(1+\rho_2)}) \quad (11)$$

$$= \delta(\sigma_1^2 - \frac{P}{G_1(1+\rho_1)}, \sigma_2^2 - \frac{P}{G_2(1+\rho_2)}) \quad (12)$$

FIG. 4C

$$a < \frac{P}{G_1(1+\rho_1)} < b \tag{13}$$

$$a < \frac{P}{G_2(1+\rho_2)} < b \tag{14}$$

$$\rho_1 > \rho_2 \tag{15}$$

$$\rho_1, \rho_2 > 0 \tag{16}$$

$$\int_{\rho_2=max(\frac{P}{bG_2}-1,0)}^{\frac{P}{max(G_1,G_2)a}-1} \int_{\rho_1=max(\frac{P}{bG_1}-1,\rho_2)}^{\frac{P}{aG_1}-1} f(C_1/\rho_1) f(C_2/\rho_2) \frac{1}{(b-a)^2} f(\rho_1,\rho_2) d\rho_1 d\rho_2 \tag{17}$$

$$\int_{\rho_2=max(\frac{P}{bG_2}-1,0)}^{\frac{P}{max(G_1,G_2)a}-1} \int_{\rho_1=max(\frac{P}{bG_1}-1,\rho_2)}^{\frac{P}{aG_1}-1} f(C_1/\rho_1) f(C_2/\rho_2) f(\rho_1,\rho_2) d\rho_1 d\rho_2 > \int_{\rho_1=max(\frac{P}{bG_1}-1,0)}^{\frac{P}{max(G_1,G_2)a}-1} \int_{\rho_2=max(\frac{P}{bG_2}-1,\rho_1)}^{\frac{P}{aG_2}-1} f(C_1/\rho_1) f(C_2/\rho_2) f(\rho_1,\rho_2) d\rho_1 d\rho_2 \tag{18}$$

$$\int_{\rho_2=max(\frac{1}{g_2K}-1,0)}^{\frac{1}{max(g_1,g_2)}-1} \int_{\rho_1=max(\frac{1}{Kg_1}-1,\rho_2)}^{\frac{1}{g_1}-1} f(C_1/\rho_1) f(C_2/\rho_2) f(\rho_1,\rho_2) d\rho_1 d\rho_2 > \int_{\rho_1=max(\frac{1}{Kg_1}-1,0)}^{\frac{1}{max(g_1,g_2)}-1} \int_{\rho_2=max(\frac{1}{Kg_2}-1,\rho_1)}^{\frac{1}{g_2}-1} f(C_1/\rho_1) f(C_2/\rho_2) f(\rho_1,\rho_2) d\rho_1 d\rho_2 \tag{19}$$

505: If (g2/g1) > T1, then select Antenna 160
510: else if (g2/g1) < (1/T1), then select Antenna 150
515: else if (g2/g1) > 0, then
520: if C1 $\notin$ [μ_{∞} - c1(g2/g1)-m1(g2/g1)*g2dB, μ_{∞} +c1(g2/g1)+m1(g2/g1)*g2dB] &
C2 $\in$ [μ_{∞} - c2(g2/g1)-m2(g2/g1)*g2dB, μ_{∞} +c2(g2/g1)+m2(g2/g1)*g2dB],
then select Antenna 160
525 : else select Antenna 150
end if
530: else if g2/g1<0 then
535: if C2 $\notin$ [μ_{∞} - c2(g2/g1)-m2(g2/g1)*g2dB, μ_{∞} +c2(g2/g1)+m2(g2/g1)*g2dB] &
C1 $\in$ [μ_{∞} - c1(g2/g1)-m1(g2/g1)*g2dB, μ_{∞} +c1(g2/g1)+m1(g2/g1)*g2dB] then select Antenna 150
540: else select Antenna 160, end if

550: else if g2<T2
555: if $(C1-\mu_{\infty})^2 - (C2-\mu_{\infty})^2 < 0$, then select Antenna 150
560: else select Antenna 160, end if

570: elseif C1>C2 then, select Antenna 150
580: else select Antenna 160, end if

FIG. 5